

Ground Zero

Reporting Category Number and Number Sense

Topic Investigating integers

Materials

- Index cards or cardstock
- Scissors
- Rational Number Flow Chart (attached)
- Number line clearly denoting zero (for display)

Vocabulary

rational number, real number, integer, positive integer, negative integer, whole number, natural number, counting number, absolute value

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

Many students struggle to classify numbers in later grades because the classifications are taught in an isolated fashion. Although the flow chart in this lesson does not address irrational numbers, it allows students to see the origin of integers. Exposing students to this concept will assist them to visualize the multiple classifications of real numbers.

Prior to the lesson, use index cards cut in half or squares cut out of cardstock to make number cards showing real numbers that are integers (whole numbers, their opposites [negatives], and zero) and fractions/decimals. Make sure that the decimals included are rational numbers. Make at least 20 cards covering each of the real number sets, and also make a couple of sets of zero pairs (e.g., -1 and 1 , -30 and 30).

1. Begin the lesson by discussing the “different types of numbers.” Explain to students that numbers are classified by several different names, just as we are classified as animals, mammals, omnivores, or humans. In practical applications, the real number system is widely used. Define *real number*. Within the entire real number system, there are various classifications that are important to know.
2. Display a large copy of the Rational Number Flow Chart, and distribute copies of the chart for students to use to record the activity. Begin with all of the number cards taped inside the “Rational Numbers” box of the display flowchart. Direct students to write each number in the “Rational Numbers” boxes on their flowcharts. Define *rational numbers*.
3. Ask students to identify each of the numbers in the box, using the terms *negative*, *positive*, *fraction*, and *decimal*.
4. On the display chart, have student volunteers move all of the numbers that are fractions/decimals to the “Fractions/Decimals” box. Direct all students to record these numbers on their personal flowcharts.

5. At this point, explain to students that all of the remaining numbers are integers. Based on this fact, have students develop a definition of **integers: the set of whole numbers, their opposites (negatives), and zero**. Have student volunteers move the remaining numbers to the appropriate boxes on the display flowchart, and direct all students to record these numbers on their personal flowcharts.
6. Next, move all numbers that have an opposite to their appropriate places on the display number line. Do not tell students that you are choosing opposite pairs. Ask students to make observations about the numbers on the number line. When they notice the opposite pairs, ask them about similarities between a number and its opposite. They should observe that opposite pairs are *the same distance from zero*. Explain the definition of the **absolute value of a number: its distance from zero on the number line regardless of direction**. Explain that there is no such thing as positive distance. (In order to reinforce this point, you may wish to have a student stand 2 units [feet] to the left of you and another student stand 2 units to the right of you. Then, ask the class how far each student is from you, pointing out that the directions left and right do not matter when measuring distance.)
7. Explain the symbol used to represent absolute value.

Assessment

- **Questions**
 - What phrase expresses the true definition of the absolute value of a number? (distance from zero)
- **Journal/Writing Prompts**
 - In your own words, describe the difference between integers and fractions.
 - Describe a few real-life situations in which integers would be the only numbers that could be used.

Rational Number Flow Chart

(excluding irrational numbers)

